Tech Fact Sheet

East Tennessee Technology Park ***Tennessee Washington***

Study of Alternative Approaches for Transite Panel Removal

Challenge

Large facilities operated by the U.S. Department of Energy (DOE) such as the Gaseous Diffusion Plant at Oak Ridge, TN and the former processing facilities at Hanford, WA are paneled entirely with transite siding (an early form of cement composite drywall panel containing up to 50% asbestos). Asbestos removal raises important worker safety issues. The panels must be treated as non-friable asbestos (Category II) with the potential of becoming friable if broken or crushed. Asbestos is considered friable if, when dry, it can be crumbled, pulverized or reduced to powder by hand pressure.

Figure 1: Manual method of removing asbestos-laden transite

These facilities comprise millions of square feet of transite which must be removed and disposed of prior to actual building structure demolition. Presently, DOE utilizes two transite asbestos abatement methods: 1) the manual method used at Oak Ridge and 2) the mechanical method used at Hanford. The manual method uses workers in man-lifts to shear the bolts holding the panel to the building with hand-held tools then remove the panel and lower it to the ground (Fig. 1). The mechanical method uses excavator equipment to pull the transite from the building and lower it to the ground (Fig. 2). With the mechanical method, wetting of the panels (in an effort to reduce friability) and water misting (to knock down airborne asbestos fibers) are generally employed. This activity necessitates the construction of water collection systems and subsequent treatment of collected asbestos contaminated water.

Figure 2: Mechanical method of removing asbestos-laden transite

This study compared the two transite removal methods based on relevant operational criteria. Additionally, laboratory testing was conducted to determine the effect of water and amended water on the release of airborne fibers when transite panels were broken or crushed.

Tech Solution

Bechtel Jacobs Company LLC (BJC) assembled an experienced team from both sites to evaluate both the manual and mechanical methods of transite panel removal. The team gathered pertinent work requirement information for both methods which included cost, equipment, waste disposal, regulatory, monitoring, training, safety, and permit requirements and the results from air monitoring of airborne asbestos fibers generated during demolition.

In addition, the Materials and Chemistry Laboratory, Inc. (MCL) at Oak Ridge was contracted by BJC to test the effectiveness of wetting transite panels to reduce airborne asbestos fiber emissions during demolition. To accomplish this, MCL constructed a test enclosure (Fig. 3) to allow testing in a closed system. Transite panels from both Oak Ridge and Hanford were sent to MCL for testing. Testing included the selection of the appropriate concentration of wetting agents, an evaluation of the penetration of the water and amended water into the transite panel, and measurement of the release of asbestos fibers into the water and the air upon breaking.

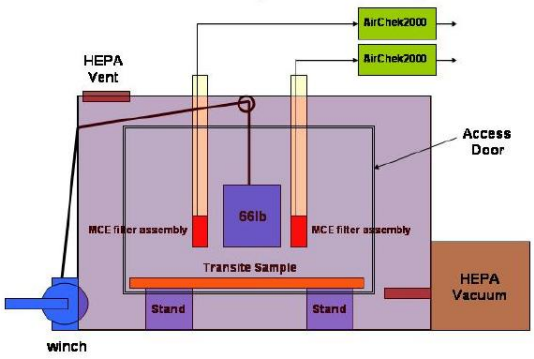

Figure 3: Transite closed system testing

Site Project & Identifier	Tech Stage: Lessons Learned
PBS OR-0040-Nuclear Facility D&D – East Tennessee Technology Park PBS RL-0041-Nuclear Facility D&D – River Corridor Closure Project	Both methods meet regulatory requirements. The choice of method will be driven by site-specific considerations.

Tech Accomplishments

In laboratory tests conducted by MCI, the exterior of the transite panels was sprayed with the following solutions: water only, 100% CC WET, water plus CC WET at a concentration of 0.1% wt., and Kidde Fire Fighting NF-300 Class "A" foam in water at a concentration of 1.0% wt. Each solution was applied to the surface for 15 minutes, 2 hours and 5 hours. An untreated panel was used as the baseline.

The test revealed that neither the water nor amended water penetrated the asbestos transite panels. Even with a wetting duration of 5 hours there was no evidence of significant penetration within the bulk transite material. Once the soaking was complete, the transite was broken within the closed system structure using a weight dropped from 12 inches above the panel surface. The air sampling/fiber counting results showed no statistically significant difference in fiber loaded with water or amended water. However, because of the limited run populations in the study and attributes not considered in this study, misting during demolition operations should not necessarily be abandoned, but further evaluated.

The results of the comparison of the two methods for panel removal indicate the manual method is labor intensive and poses additional safety hazards such as elevated work, heat stress, and ergonomics. The mechanical method relies on equipment, is less labor intensive, and reduces some of the hazards associated with the manual method. Cost data available for this study was somewhat limited but the mechanical method appeared to be both faster and less costly. Both methods comply with the standards for airborne asbestos particles however, the mechanical method has a greater potential for release of asbestos.

Impact

Millions of square feet of transite must be removed from facilities in the DOE complex. This study provides DOE EM D&D project managers and regulators with a reference to compare the requirements and benefits of the two alternative methods. Both methods have proven to meet all regulatory requirements and be protective of workers and the environment. The Mechanical Method seems to be faster and less costly; however there are site-specific considerations to be taken into account by the project managers and stakeholders before choosing an approach. This study may help facilitate that decision making.

Impact and Features

- Both methods meet regulatory requirements
- Water applied to the surface of the panel does not penetrate the transite and does not decrease airborne fiber concentrations upon breaking.
- The manual method is more labor intensive and poses potential industrial safety hazardous such as elevated work, heat stress, and ergonomic injury
- The manual method is less likely to produce airborne asbestos, however, air sampling during removal by means of the mechanical method did not detect airborne asbestos above the regulatory limits
- Based on the data available for this study, the mechanical method appears to be faster and more cost effective. This would facilitate:
  - Cost reduction
  - Schedule acceleration

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Technology Name	Study of Alternative Approaches for Transite Panel Removal
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Challenge Category	Tech Solution Category
• Dismantlement • Demolition • Contaminant Migration Control	• Dismantlement • Demolition • Waste Handling and Packaging